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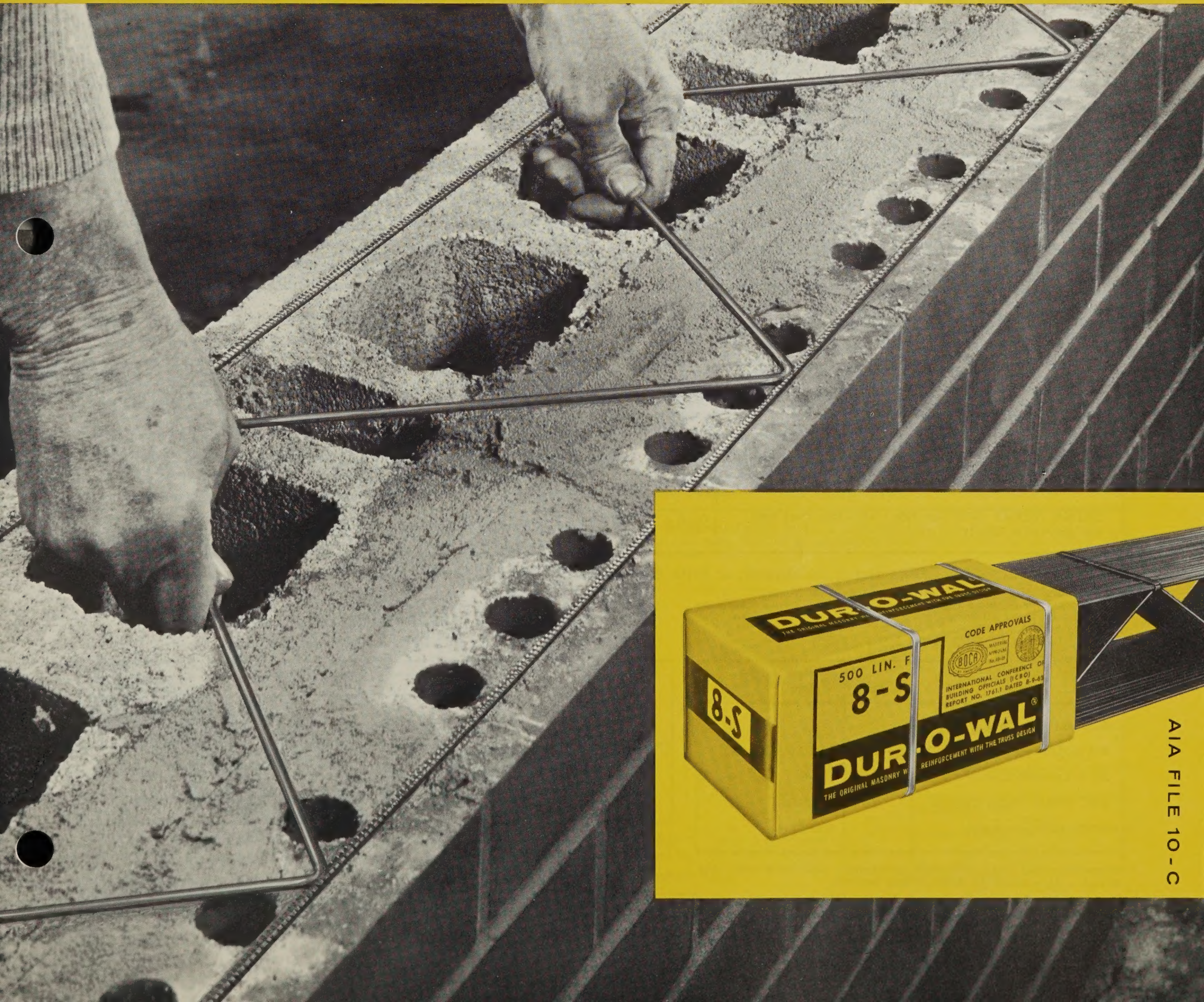
DUR-O-WAL®

THE ORIGINAL MASONRY WALL REINFORCEMENT WITH THE TRUSS DESIGN


DUR-O-WAL
THE ORIGINAL MASONRY WALL REINFORCEMENT WITH THE TRUSS DESIGN
CODE APPROVALS
BOCA
INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO) REPORT NO. 1761.1 DATED 8-9-63
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DUR-O-WAL®
THE ORIGINAL MASONRY WALL REINFORCEMENT WITH THE TRUSS DESIGN

AIA FILE 10-C

DUR-O-WAL®

The original masonry wall reinforcement with the truss design

FUNCTIONS AND APPLICATION

- To provide practical means of minimizing shrinkage, temperature and settlement cracking in masonry
- To provide for part or all of required horizontal steel in reinforced masonry
- To provide mechanical anchorage and horizontal flexural strength in stacked bond masonry
- To provide for bonding of composite walls in lieu of masonry headers
- To reinforce and tie together adjacent wythes in cavity walls
- To anchor masonry veneers to structural masonry and to serve as metal ties at wall intersections
- To assure a predictable horizontal flexural and axial tensile strength in all masonry walls

ADVANTAGES

- Mechanical bond every 8 inches of wall
- Two mortar locks at each weld
- Deformed side rods lay straight and flat
- Electric butt welds place all rods on a single plane
- Truss design causes side rods to work together
- Conforms to ASTM Standard A82-62T for high tensile steel
- 10-foot lengths for easy handling
- 6-inch lap at splices develops continuity and maintains reinforcing strength
- Deformed side rods for maximum bond strength
- All steel in single plane makes possible uniform mortar joints
- More pounds of working steel for greater wall strength

DESCRIPTION — Dur-O-waL is a prefabricated reinforcement especially designed for embedment in the horizontal mortar joints of masonry. It is manufactured in 10 ft. lengths from cold drawn steel wire conforming to ASTM A82-62T. It consists of two parallel side rods weld connected to a continuous, diagonally oriented cross rod thus forming a truss design. Side rods are deformed for better bond with mortar. Out to out spacing of side rods is approximately two inches less than the nominal thickness of the wall or wythe in which the reinforcement is installed.

Dur-O-waL SELECTION TABLE	No. 3 (For 3″ Wall)	No. 4 (For 4″ Wall)	No. 6 (For 6″ Wall)	No. 8 (For 8″ Wall)	No. 10 (For 10″ Wall)	No. 12 (For 12″ Wall)	No. 13 (For 13″ Wall)	No. 14 (For 14″ Wall)	No. 16 (For 16″ Wall)
STANDARD No. 9 Gage Side Rods • No. 9 Gage Cross Rods Wt. per 1,000 lin. ft.	177#	178#	180#	187#	196#	207#	212#	220#	236#
EXTRA HEAVY 3/16″ Side Rods • No. 9 Gage Cross Rods Wt. per 1,000 lin. ft.	246#	247#	250#	257#	266#	276#	282#	290#	306#

FINISHES AVAILABLE — Brite Basic, Galvanized, or Brite Basic Hot Dip Galvanized after Fabrication.

Manufactured from high tensile steel conforming to ASTM standard A82-62T or Federal Specifications. Special sizes available to meet specific application needs. Prefabricated corner and tee sections available.

TYPES AND ROD SIZES

Dur-O-waL Type	Side Rods No.	Side Rods Gage	Cross Rods Gage
S (Standard)	2	9	9
EH (Extra Heavy)	2	3/16	9
SC (Standard Cavity)	2	9	9
EHC (Extra Heavy Cavity) .	2	3/16	9
SPC (Special Cavity)	4	9 or 3/16	9

Types SC, EHC and SPC have galvanized cross rods with drip section. Also available without drip section.

Sizes are No. 3 (3″ wall) through No. 16 (16″ wall). Other sizes available to meet specific application needs.

EFFECTIVE STEEL AREAS OF DUR-O-WAL (TRUSS DESIGN) IN LONGITUDINAL TENSION

Dur-O-waL Type	Effective Area, sq. in.								
	3″ Wall	4″ Wall	6″ Wall	8″ Wall	10″ Wall	12″ Wall	13″ Wall	14″ Wall	16″ Wall
S*	.052	.051	.050	.048	.047	.045	.045	.044	.043
EH**	.072	.072	.071	.069	.068	.066	.066	.065	.064

*Standard Dur-O-waL; No. 9 gage side rods and No. 9 gage cross rods.

**Extra Heavy Dur-O-waL; 3/16″ side rods and No. 9 gage cross rods.

Note: Area of 2 side rods only; 0.0346 sq. in. for Standard and 0.0554 sq. in. for Extra Heavy Dur-O-waL. The difference between these values and the values shown is .0173 cos ϕ, the allowance for the longitudinal tensile resistance of the diagonal cross rods.

© Dur-O-waL National, Inc., 1964

GENERAL SPECIFICATIONS FOR THE USE OF DUR-O-WAL

Masonry wall reinforcement shall be Dur-O-waL truss design or approved equal truss design and shall have product approval by Southern Building Code Congress (SBCC), Building Officials Conference of America, Inc. (BOCA) or International Conference of Building Officials (ICBO) building codes.

Dur-O-waL shall be manufactured from cold drawn steel wire conforming to ASTM A82-62T, and shall consist of two deformed longitudinal rods welded at 16-inch intervals to a continuous diagonal cross rod forming a truss design. Out to out spacing of side rods shall be approximately 2-inches less than the nominal thickness of the wall or wythe. Cross rods shall be not less than No. 9 gage. Cross rods which serve as metal ties in cavity and other multi-wythe walls shall be galvanized.

Prefabricated or job fabricated corner and tee sections shall be used to form continuous reinforcement around corners, and for anchoring abutting walls and partitions. Material in corner and tee sections shall correspond to type and design of reinforcement used.

Unless otherwise noted on the plans, masonry walls shall be reinforced with Type — (indicate type) — Dur-O-waL except that cavity walls shall be reinforced with Type — (indicate type) — with drip section cross rods. Unless otherwise noted, reinforcement shall be installed in the first and second bed joints, 8-inches apart immediately above lintels and below sills at openings and in bed joints at 16-inch vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend two feet beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical masonry control joints. Side rods shall be lapped at least 6-inches at splices. Reinforcement shall be so placed as to assure a ⅝″ mortar cover measured from outside face of mortar joint.

Short Specification — Masonry wall reinforcement as noted on plans shall be Dur-O-waL truss design or equal truss design and shall have product approval by SBCC, BOCA, or ICBO building codes and be installed in strict accordance with manufacturer's recommendations.

CODE APPROVALS — Dur-O-waL Truss Design masonry wall reinforcement has been granted material approvals for multiple use in masonry wall construction in following Regional and National Codes:

Southern Building Code Congress (SBCC) Report 6322

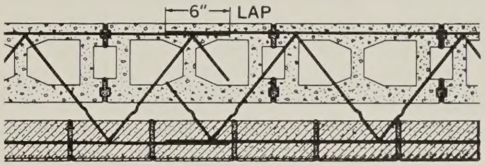
Building Officials Conference of America, Inc. (BOCA) Approval No. 63-19 — SBR 186

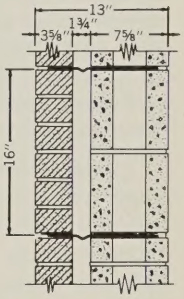
International Conference of Building Officials (ICBO) Report No. 1761.2

Central Mortgage and Housing Corporation (CMHC) Acceptance No. 2813 (Revised) Section 12-3, 115-3-12-3-3

Basically the above codes approve use of Dur-O-waL for bonding the facing and backing of cavity walls, solid walls and hollow masonry walls, for bonding multiwythe masonry walls in lieu of brick headers, as a reinforcement in structural glass block panels, for bonding intersecting masonry bearing walls, as reinforcement for load bearing masonry walls laid in stacked bond, as metal ties for anchorage of masonry veneer and for use of part or all of the required horizontal reinforcement in reinforced masonry.

For specific and detailed approval information contact Dur-O-waL National, Inc., Cedar Rapids, Iowa.





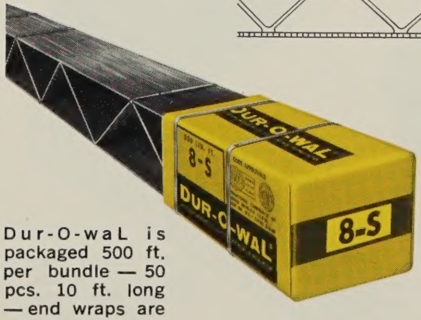
Codes generally call for a minimum of one 3/16″ dia. tie for each 3 to 4½ sq. ft. of wall. Dur-O-waL exceeds this requirement and provides maximum anchorage with positive and uniform spacing of ties. It also reinforces the masonry longitudinally.

Comparison Table — Various Type Cavity Wall Ties

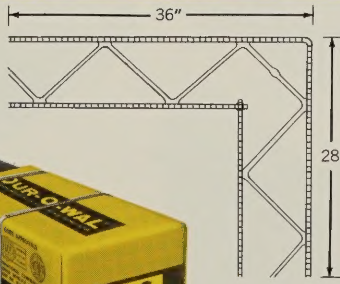
Type	Spacing	Cross Sectional Areas of Ties per sq. ft. Wall
Z-Ties, 3/16″ dia.	1 for each 3 sq. ft. 1 for each 4½ sq. ft.	.0092 sq. in. .0061 sq. in.
Rectangular ties, two 3/16″ dia.	1 for each 3 sq. ft. 1 for each 4½ sq. ft.	.0184 sq. in. .0122 sq. in.
U-Ties, two 3/16″ dia.	1 for each 3 sq. ft. 1 for each 4½ sq. ft.	.0184 sq. in. .0122 sq. in.
Dur-O-waL, No. 9 gage	Spaced 16 in. o.c. vertically	.0196 sq. in.

Dur-O-waL for Cavity Walls is furnished with brite basic steel side rods and galvanized cross rod, or all galvanized steel rods or hot dip galvanized after fabrication.

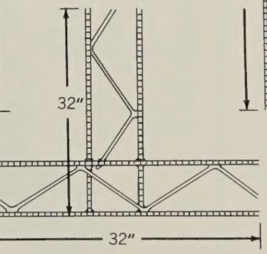
FEATURES



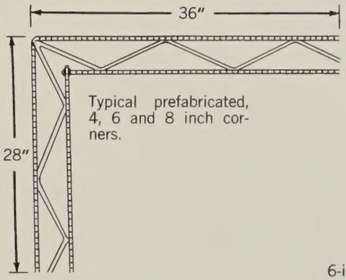
Dur-O-waL is packaged 500 ft. per bundle — 50 pcs. 10 ft. long — end wraps are clearly marked for easy identification.



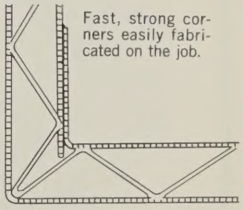
Typical prefabricated corners, all sizes 10 and over.



Typical prefabricated Tee Section, available all sizes and combinations.

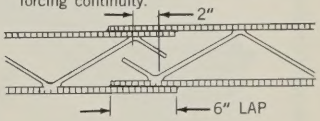


Typical prefabricated, 4, 6 and 8 inch corners.



Fast, strong corners easily fabricated on the job.

6-inch lap at the splices maintains reinforcing continuity.



RESEARCH — Dur-O-waL sponsored and independent investigations have developed the following authoritative data on the mechanical and structural properties of Dur-O-waL Truss Design Reinforcement.

Bond: Dur-O-waL deformed side rods develop maximum bond stresses exceeding 780 psi with ASTM Type M (2500 psi) mortar and 435 psi with ASTM Type N (750 psi) mortar. The bond values were about twice those obtained with smooth wire. *Toledo University Research Center*

Mortar: Structural interaction between reinforcement and masonry requires adequate bond between mortar and masonry units. ASTM Type S (1800 psi) or stronger mortar should be used with Extra Heavy Dur-O-waL and ASTM Type N (750 psi) or stronger mortar should be used with Standard Dur-O-waL. In general, the effectiveness of masonry reinforcement increases with the strength and bond of the mortar. *Toledo University Research Center*

Shear Transfer: The longitudinal shear strength of Dur-O-waL Type SC (No. 9 gage wire) across a 2½-inch cavity space is 886 lb. per truss panel without crimp section cross rods and 446 lb. per truss panel with crimp section cross rods. These values are several times those obtained with right angle (non-truss) types of ties and reinforcement cross rods. *Armour Research Foundation*

Compression Buckling: Dur-O-waL Type SC (No. 9 gage wire), bridging across a 2½-inch cavity space, resisted a buckling load of 1080 lb. per truss panel without crimp section cross rods and 508 lb. per truss panel with crimp section cross rods. These values provide an adequate safety factor against buckling failure of cross rods in cavity construction. *Armour Research Foundation*

Cavity Walls: Cavity walls were tested for flexural strength in the horizontal span. Dur-O-waL with No. 9 gage crimped section cross rods proved as effective as 3/16-inch Z and rectangular ties with drip section. *Armour Research Foundation*

Composite Walls: Eight inch and 12-inch thick wall panels of brick facing and concrete block back-up tied with (a) brick headers, (b) Standard Dur-O-waL Truss Design and (c) Continuous Rectangular Ties were tested for compressive strength. The panels tied with Dur-O-waL Truss Design were the strongest, their compressive strength averaging 724 psi on the gross bearing area compared to 640 psi and 585 psi respectively for the panels built with Continuous Rectangular Ties and brick headers. *Armour Research Foundation*

Stacked Bond Walls: Eight inch thick concrete block panels laid in running bond and in stacked bond, both types with and without reinforcement, were compared as to flexural strength in the horizontal span. Ultimate resisting moments per foot of wall height for the panels laid with ASTM Type M (2500 psi) mortar were as follows:

Running Bond

No reinforcement	10,900 in.-lb/ft.
Standard Dur-O-waL 16″ c. to c.	12,600 in.-lb/ft.
Standard Dur-O-waL 8″ c. to c.	17,300 in.-lb/ft.

Stacked Bond

No reinforcement	4,200 in.-lb/ft.
Standard Dur-O-waL 16″ c. to c.	10,900 in.-lb/ft.
Standard Dur-O-waL 8″ c. to c.	16,000 in.-lb/ft.

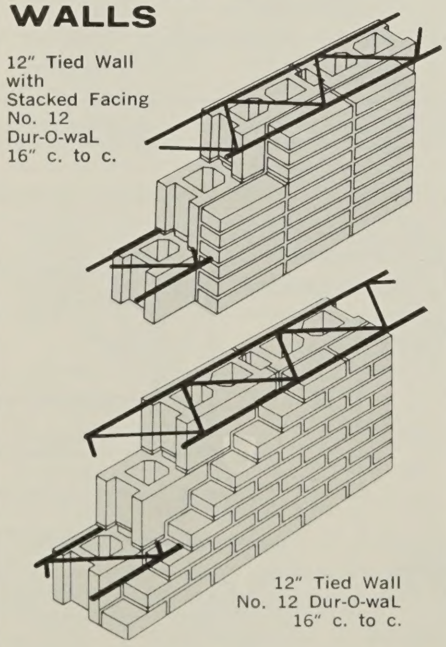
Portland Cement Association — Hedstrom Report

For more complete technical information on Dur-O-waL write for a free copy of Dur-O-waL's Comprehensive Data File. Some individual research reports are also available.

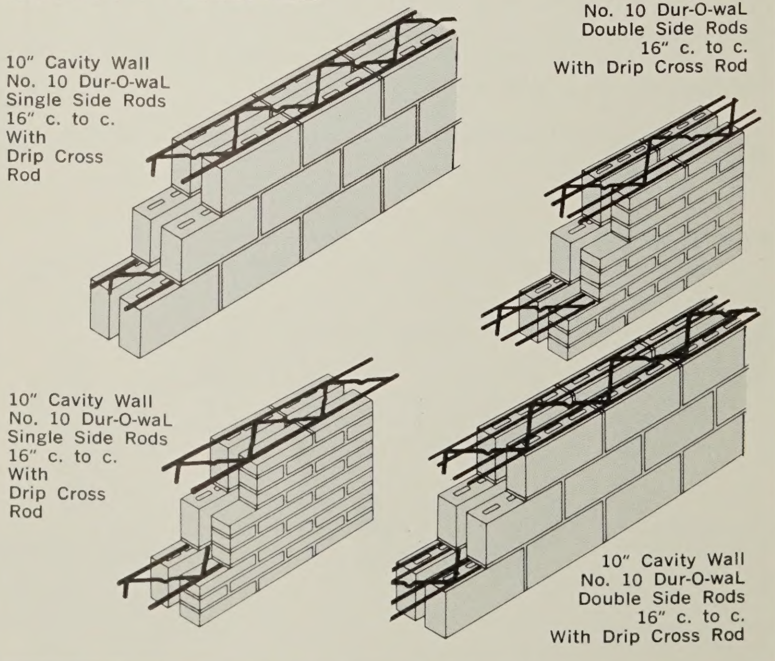
NOTE: See list of Technical and Research Data available, page 11.

BASIC DUR-O-WAL APPLICATIONS

COMPOSITE WALLS


12″ Tied Wall with Stacked Facing No. 12 Dur-O-waL 16″ c. to c.
12″ Tied Wall No. 12 Dur-O-waL 16″ c. to c.

CAVITY WALLS


10″ Cavity Wall No. 10 Dur-O-waL Single Side Rods 16″ c. to c. With Drip Cross Rod
10″ Cavity Wall No. 10 Dur-O-waL Double Side Rods 16″ c. to c. With Drip Cross Rod
10″ Cavity Wall No. 10 Dur-O-waL Single Side Rods 16″ c. to c. With Drip Cross Rod
10″ Cavity Wall No. 10 Dur-O-waL Double Side Rods 16″ c. to c. With Drip Cross Rod

There are three points of importance in comparing quality:

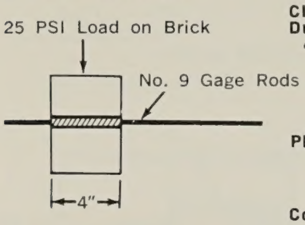
1 — Weight of material — actual weight per 1000 lineal feet — flexural strength in relation to weight of steel in wall. 2 — Deformation — effect on surface bond — effect on wire strength. 3 — Mortar locks.

1. WEIGHT OF MATERIAL

a. Research tests clearly indicate that when Class M mortars are used, the flexural strength of walls increases uniformly as the weight of steel increases.

b. Comparative weights . . . See Selection Table, page 2. No. 8 for 8″ walls. Truss Type Standard Dur-O-waL is 33% heavier than Standard Other Type. Truss Type Extra Heavy Dur-O-waL is 31% heavier than Extra Heavy Other Type.

2. DEFORMATION



a. Comparative tests — No. 9 Gage Rods/ 4″ Embedment/ 3/8″ Mortar Joints/ 4″ Concrete Brick/ 25 PSI Load on Brick

CLASS M MORTAR
Dur-O-waL (Deformed)

"No slip" Load 1455 lbs. Av. — Rods Failed on Tension. Bond Stress — Exceeds 780 lbs. sq. in. surface area. Maximum bond stress — not determined as rods failed.

Plain Rods

"Slip" Load 505 lbs. Av. — Rods pulled out. Maximum bond stress — 270 lbs. sq. in surface area.

Conclusions —

Dur-O-waL (deformed rods) had 188% more bonding value than plain rods.

CLASS N MORTAR
Dur-O-waL (Deformed)

"slip" Load 825 lbs. Av. — Rods pulled out. Maximum bond stress — 435 lbs. sq. in. surface area.

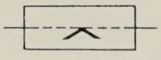
Plain Rods

"slip" Load 430 lbs. Av. — Rods pulled out. Maximum bond stress — 230 lbs. sq. in. surface area.

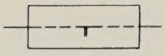
Conclusions —

Dur-O-waL (Deformed rods) had 89% more bonding value than plain rods.

3. MORTAR LOCKS



Dur-O-waL Joint
Plan View



Other Type Joint
Plan View

Comparative test results — involving joint only No. 9 Gage Rods/ Cast in 3/8″ mortar joints/ 4″ x 8″ Concrete Brick/ Cross rods cut off 3/4″ from side rods/ side rods neutralized with heavy coating of grease

CLASS M MORTAR

"Load at Initial Slip"

Dur-O-waL	1115 lbs. Average
Other Type	760 lbs. Average

Dur-O-waL 46% Greater

Same test repeated on Dur-O-waL with 3/16″ side rods and No. 9 gage cross rods
"Load at Initial Slip" 1280 lbs. Average

CLASS N MORTAR

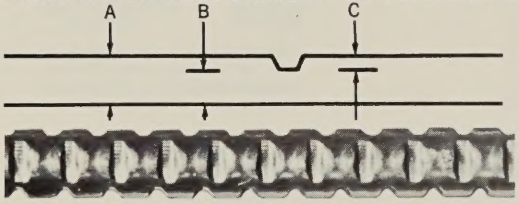
"Load at Initial Slip"

Dur-O-waL	665 lbs. Average
Other Type	525 lbs. Average

Dur-O-waL 26% Greater

NOTE: "no slip" is defined as no movement, on needle of .0001 inch indicating dial gage, occurring at any time during test. "Load at Initial Slip" is tensile force on rod at instant unloaded end registered movement of .0010 inches. As a large percentage of masonry is laid up with Class N mortar, the high values developed with Dur-O-waL double mortar locks and deformation of side rods is extremely important. Full strength of side rods is developed by lapping 4″ in Class M mortar and 8″ in Class N mortar. If lapped as per Dur-O-waL recommended detail 6″ lap for Class N is sufficient, because of locks in lap area.

MICROMETER MEASUREMENT OF DEFORMATION

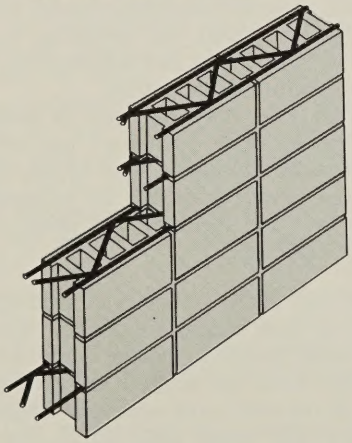


A — Overall Measurement After Deformation.
B — Bottom of Deformation to Outside Surface.
C — Required Depth of Deformation

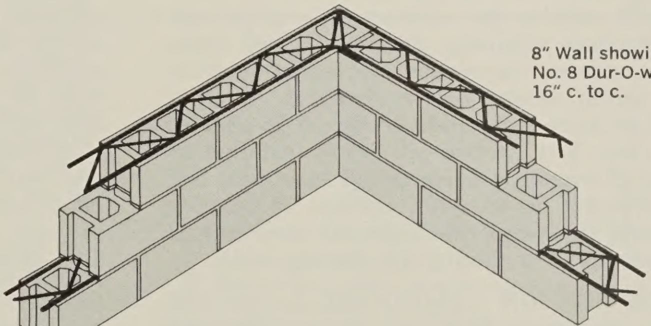
Size of Wire	Diameter of Wire Inches	A	B	C
3/16	.1875	.192	.168	.024
#8	.1620	.165	.143	.022
#9	.1483	.150	.132	.018

Direct measurement of B equal to Table above will give required depth of deformation C.

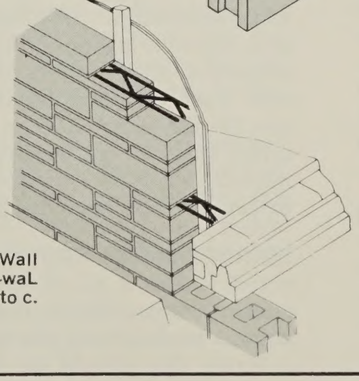
PLAIN WALLS



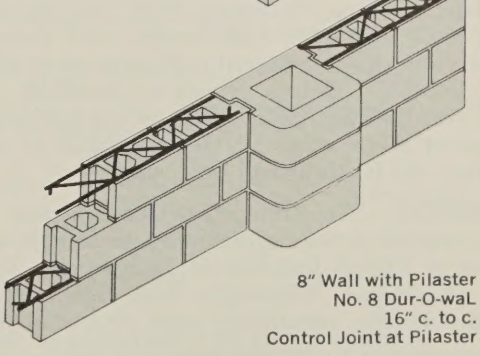
Stacked Bond
Load Bearing Walls
Dur-O-waL —
8″ c. to c.
Top 3 Courses
16″ c. to c.
Remainder of wall
Non Load Bearing Walls
Dur-O-waL —
16″ c. to c.



8″ Wall showing Corner
No. 8 Dur-O-waL
16″ c. to c.

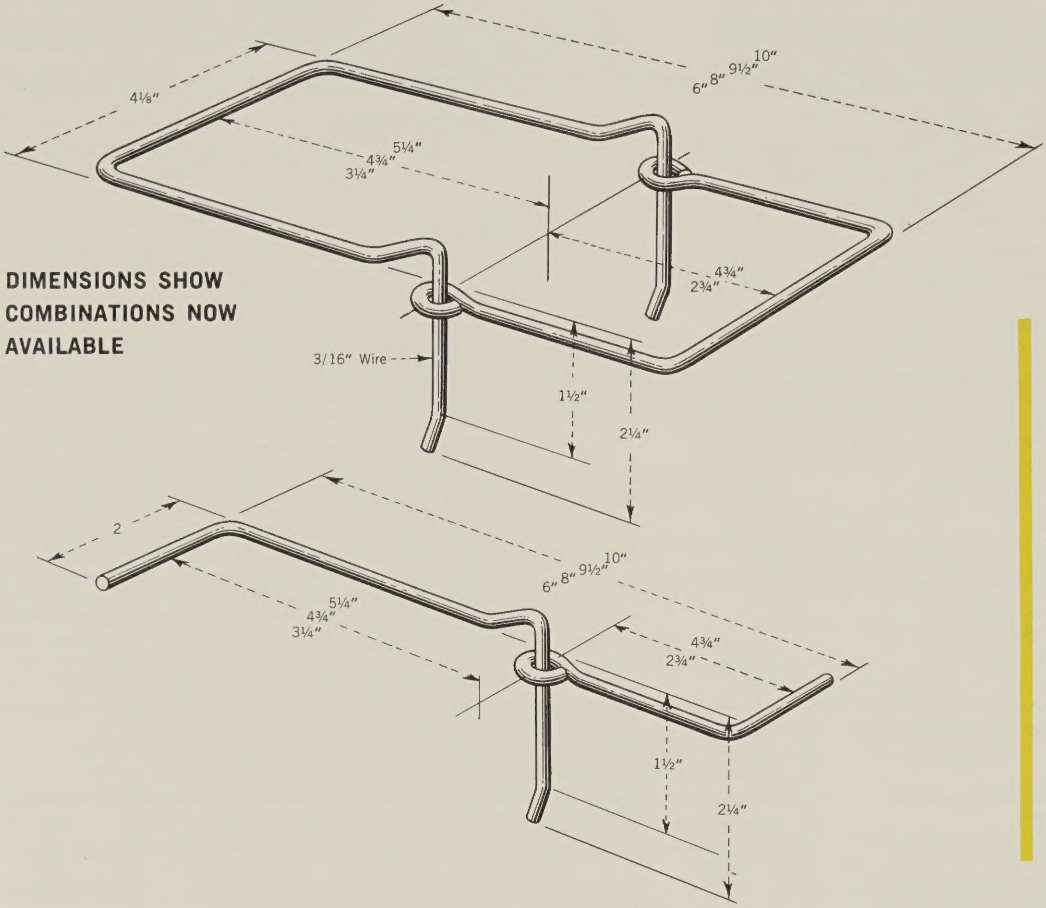


6″ Coursed Masonry Wall
No. 6 Dur-O-waL
16″ c. to c.

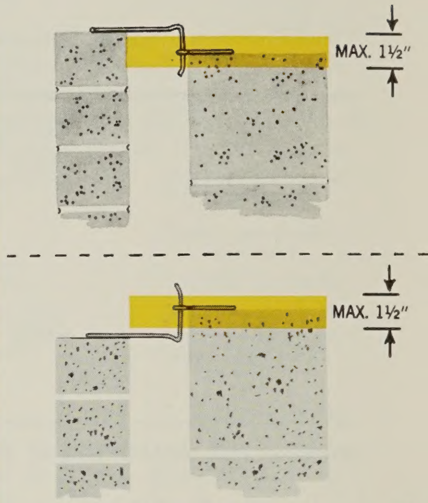


8″ Wall with Pilaster
No. 8 Dur-O-waL
16″ c. to c.
Control Joint at Pilaster

ADJUSTABLE WALL TIES



DIMENSIONS SHOW COMBINATIONS NOW AVAILABLE



Adjustable to maximum of 1½" or ½ thickness of brick. Dur-O-waL in alternate courses.

ADVANTAGES — The Adjustable Wall Tie* is adaptable to correctly coursed work or to job conditions where the facing and backing do not course out level at proper intervals or where it is desired to build one wythe ahead of the other. ■ It enables the contractor to adopt new construction techniques resulting in saving labor costs. ■ It enables the masons to concentrate on one wythe of wall to any given height before changing to other wythe, resulting in increased productivity. ■ It enables the architect to see, first, if ties are being installed as specified, second, if mason is keeping full head and bed joints. ■ It eliminates the mason's problem of bending and reshaping rigid ties when misalignment occurs. ■ It also provides a means of anchoring intersecting walls.

MATERIAL SPECIFICATION — Dur-O-waL Z-type and Rectangular-type Adjustable Wall Ties are manufactured from 3/16" diameter, high tensile, cold drawn steel wire which conforms to material requirements of ASTM Standard A82-62T. Unless otherwise specified, all ties will have zinc coating (galvanized) which conforms to ASTM Standard A116, class 1. Other weights of coatings and finishes can be furnished on request.

RESEARCH — The strength of the ties was investigated in a program of tests directed by Armour Research Foundation of Illinois Institute of Technology. Tests indicate that Dur-O-waL Adjustable Wall Ties, used as recommended herein, adequately meet structural requirements.

WALL DESIGN CONSIDERATIONS — The function of cavity wall ties is to anchor the two wythes together so that structural failure of one wythe independently of the other will not occur. Cavity wall ties are not intended or designed to provide unit action between wythes in resisting transverse or vertical loads. They are stiff enough to cause both wythes to deflect simultaneously and similarly under bending loads so that the resisting moment of the wall is equal to the sum of the resistances of both wythes developed at maximum deflection.

Although Adjustable Wall Ties may be used in faced wall under certain conditions, their principal use will be in cavity and veneered walls. In these wall types the primary consideration is the capacity of the tie to serve as a compression strut so that the inner wythe takes its proportionate share of the wind load.

RECOMMENDED SPACING OF TIES — Research findings and engineering analyses of code requirements for wind pressures, distribution of wind loads to spans, etc., indicate that Rectangular-type Ties be spaced to provide one tie for every 2.66 sq. ft. of wall area and not farther apart than 16 in. vertically nor more than 24 in. horizontally. Z-type Adjustable Wall Ties should be spaced to provide one such tie per 1.33 sq. ft. of wall area.

REQUIREMENTS FOR EXTRA TIES — Ties should be located within 8 in. of each side of vertical supports and control joints. Extra ties as currently required by codes should be located around openings.

Extra ties should be installed where special attention

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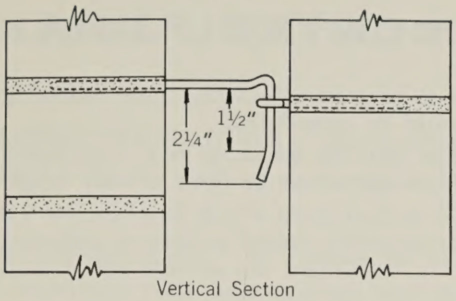
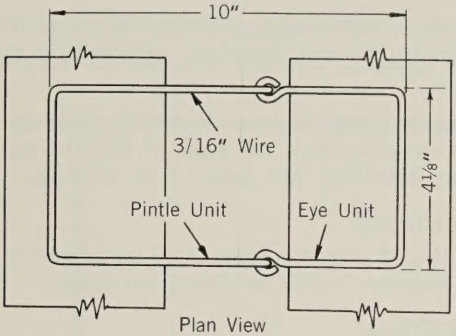
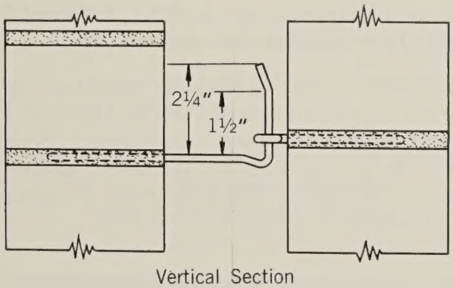
*Patent applied for.



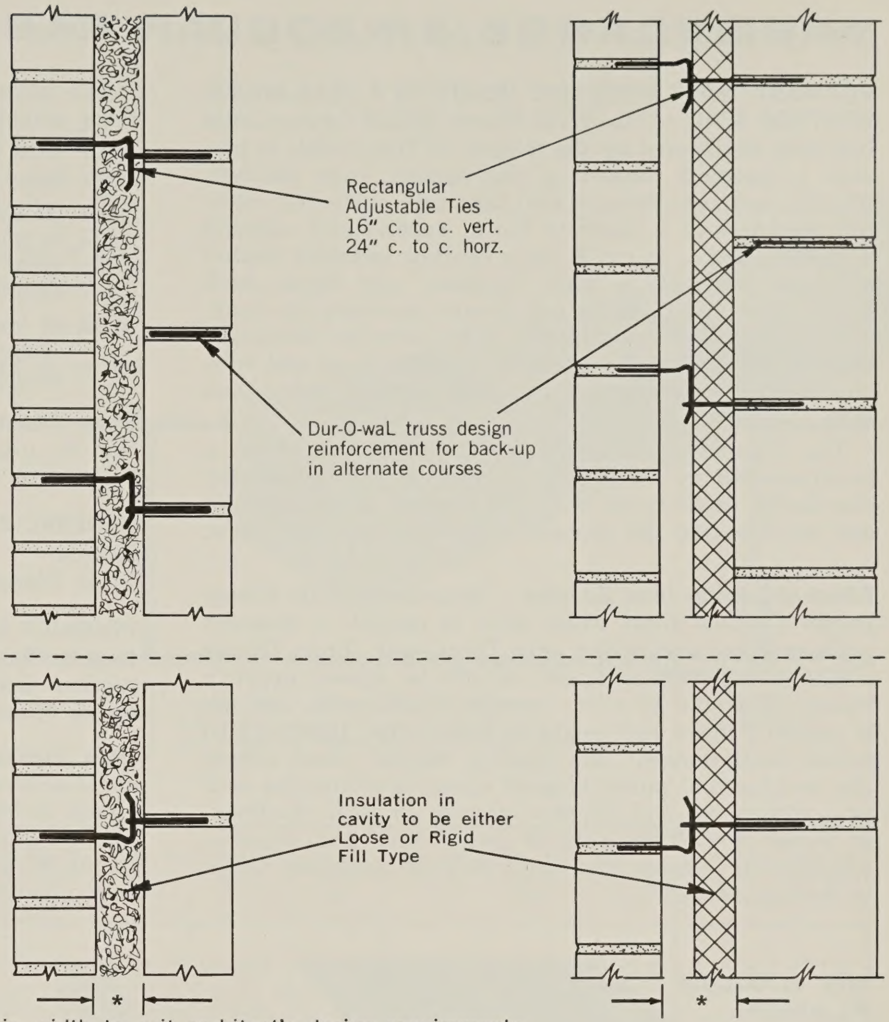
Vertical Section



Plan View



Vertical Section



*Cavities may vary in width to suit architect's design requirements.

to tie location is desirable.

Extra ties are not necessary at points of support where solid bridging is used.

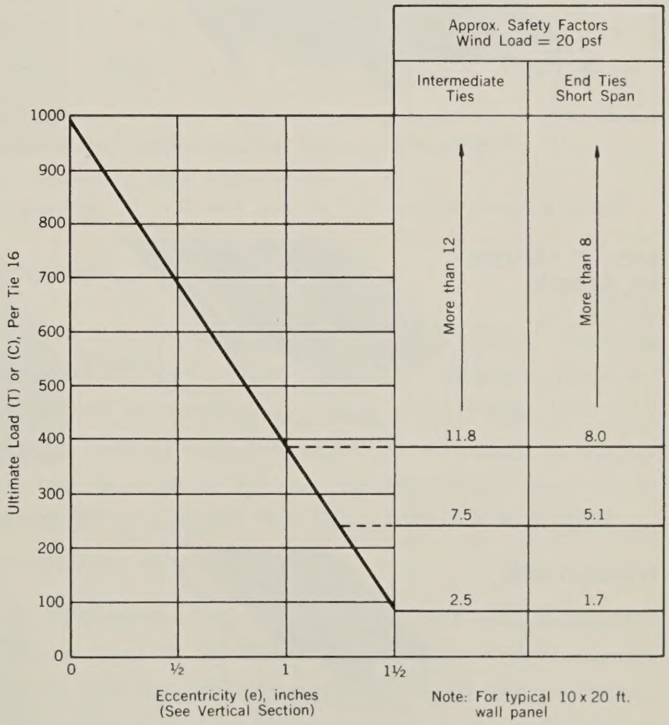
TIE STRENGTH AND SAFETY FACTORS WHERE ECCENTRICITY IS LESS THAN 1½ INCHES—The eccentricity of the compressive or tensile forces acting on an adjustable tie is equal to the vertical distance between the bed joints in which companion eye and pintle components are embedded. It may vary from zero to a maximum of 1½ in. and in this range the strength of double pintle ties varies from 980 lb. (at zero eccentricity) to 80 lb. (at 1½ in. eccentricity).

Consequently, as previously mentioned, the load capacity of the ties and the resulting safety factors increase very rapidly with decreases in eccentricity below the maximum. The relationships are shown in Fig. 11.

For example, reducing the eccentricity from 1½ in. to 1 in. results in increasing the load capacity per tie from 80 lb. to 380 lb. and proportionate increases in the safety factors.

The maximum tie spacings which have been recommended in this report are based on the capacity of the ties when installed at the maximum eccentricity for which they are designed. This is considered the proper basis even though most applications of adjustable ties will involve smaller eccentricities.

For complete report on structural properties of Adjustable Wall Ties write Dur-O-waL National, Inc., Cedar Rapids, Iowa.



EFFECT OF ECCENTRICITY (e) ON TIE STRENGTH AND ON SAFETY FACTORS

WIDE FLANGE & REGULAR RAPID® CONTROL JOINT

QUICKEST, MOST EFFECTIVE MEANS TO A YEAR-ROUND WEATHER SEAL — The Wide Flange Rapid Control Joint has been engineered by the makers of Dur-O-waL to provide a complete answer to the control joint problem. Flexible neoprene flanges, that take care of the full working thickness of a concrete block, expand and contract with the joint — to make up a quickly installed control structure that lets a wall "breathe," yet keeps itself sealed tight. Caulking is not always necessary in standard concrete block construction. The neoprene compound used is resistant to flex-cracking, weather, heat and cold. Not harmed by oil or solvents. The concave edge allows easy compression.

The Regular (narrow flange) Rapid Control Joint is recommended by construction engineers for various special needs. Both types of Rapid Control Joint fit neatly and quickly into the grooves of metal sash jamb block.

Effect of Control Joint Spacing — Regular or Wide Flange Rapid Control Joint when used in design of masonry walls and in combination with Dur-O-waL Truss Design masonry wall reinforcement, should be spaced approximately 20 feet c. to c. for average height walls, and not to exceed 2 times wall height for high walls. Incorporated within limitations of this spacing, control joints should also be placed at points of great stress concentration such as — *change in wall heights; change in wall thickness; at chases in wall required for pipes, vents and columns; abutment of columns and wall, and over weakened planes in foundation walls.*

For control joint to perform adequately, the following three principles should be considered:

1. The joint must cut the masonry wall completely from top to bottom, so as to form a truly stress relieving joint.
2. It must be structurally sound in that a sufficient shear action is developed to provide for lateral stability.
3. It must be either self-sealing or one that can be easily caulked to prevent moisture penetration or leakage.

Shear Strength — In tests at Armour Research Foundation the ultimate transverse shear strength of Rapid Control Joints was over 4700 lbs. per lineal foot of joint.

GENERAL SPECIFICATIONS:

Regular }
Wide Flange } Rapid Control Joint shall be placed in masonry walls as noted on plans.

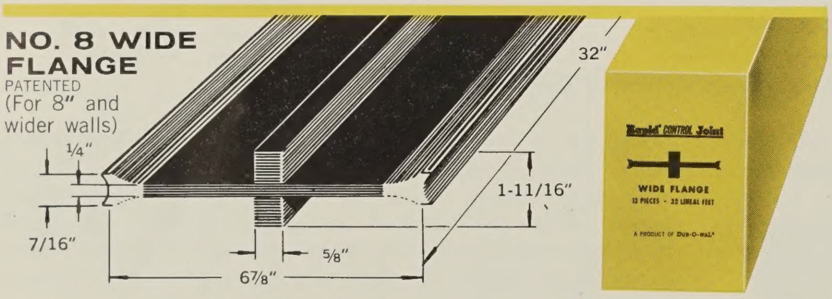
PRODUCT SPECIFICATION:

Regular Rapid Control Joint — Rubber material for shear section shall meet requirements of ASTM D735-61T Grade R-805 with 80 shore durometer hardness.

Wide Flange Rapid Control Joint — Rubber material for shear section shall meet requirements of ASTM D735-61T Grade R-805 with 80 shore durometer hardness. Neoprene compound for flange section shall meet requirements of ASTM D735-61T Grade SC-310C with 30 shore durometer hardness.

NO. 8 WIDE FLANGE

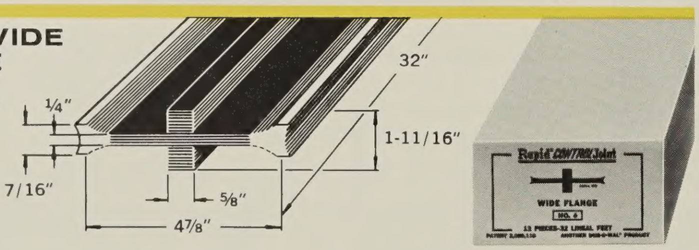
PATENTED
(For 8" and wider walls)



Carton Contents: 12 pcs. 32" long, total 32'. Shipping weight 53 lbs.

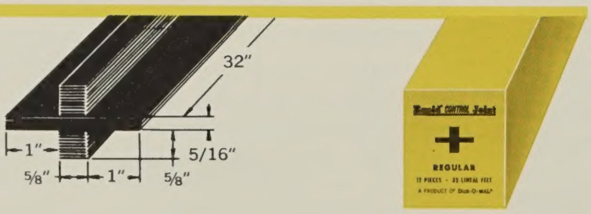
NO. 6 WIDE FLANGE

PATENTED
(For 6" walls only)

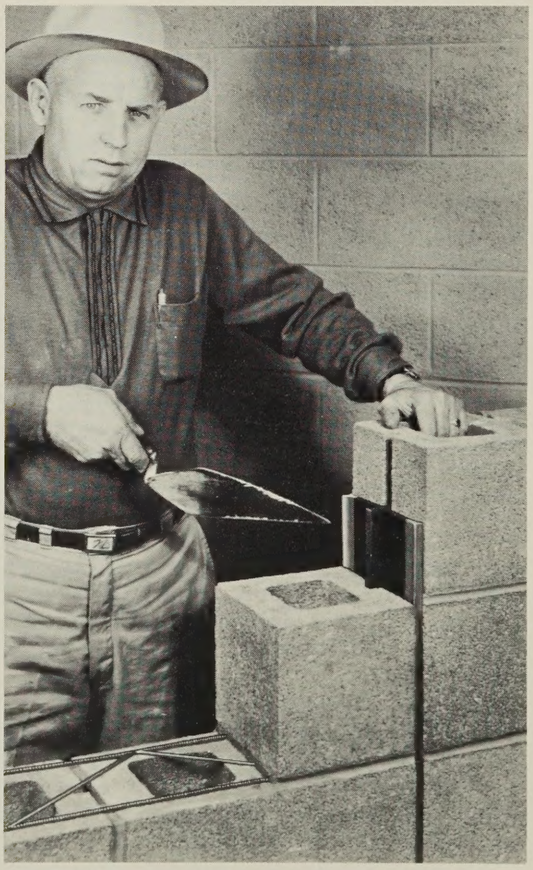


Carton Contents: 12 pcs. 32" long, total 32'. Shipping weight 41 lbs.

REGULAR



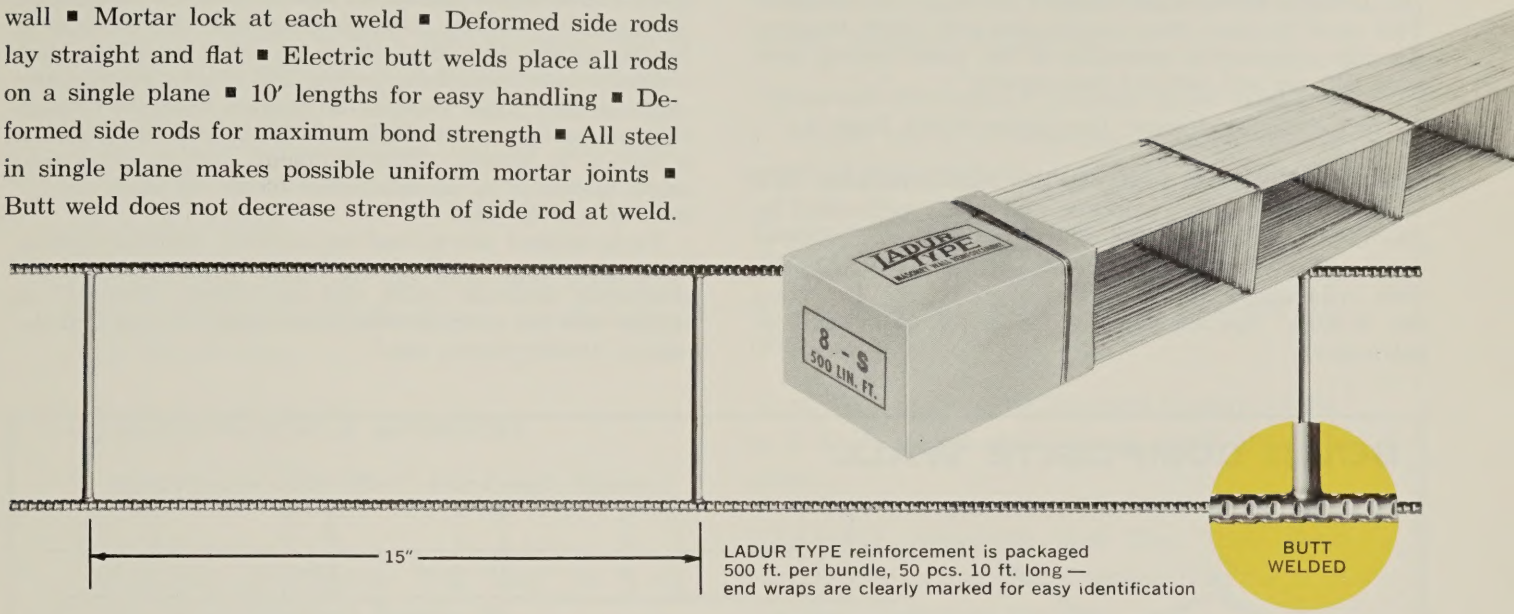
Carton Contents: 12 pcs. 32" long, total 32'. Shipping weight 31 lbs.



The Rapid Control Joint comes in sections, four block courses in depth. Quickly, easily installed, it saves time and money.

LADUR TYPE® MASONRY WALL REINFORCEMENT

LADUR TYPE FEATURES — Mechanical bond every 15″ of wall ■ Mortar lock at each weld ■ Deformed side rods lay straight and flat ■ Electric butt welds place all rods on a single plane ■ 10′ lengths for easy handling ■ Deformed side rods for maximum bond strength ■ All steel in single plane makes possible uniform mortar joints ■ Butt weld does not decrease strength of side rod at weld.



LADUR TYPE reinforcement is packaged 500 ft. per bundle, 50 pcs. 10 ft. long — end wraps are clearly marked for easy identification

LADUR TYPE SELECTION TABLE	No. 3 (For 3″ Wall)	No. 4 (For 4″ Wall)	No. 6 (For 6″ Wall)	No. 8 (For 8″ Wall)	No. 10 (For 10″ Wall)	No. 12 (For 12″ Wall)	No. 13 (For 13″ Wall)	No. 14 (For 14″ Wall)	No. 16 (For 16″ Wall)
STANDARD No. 9 Gage Side Rods • No. 9 Gage Cross Rods Wt. per 1,000 lin. ft.	123#	125#	132#	139#	147#	155#	159#	163#	171#
MEDIUM No. 8 Gage Side Rods • No. 9 Gage Cross Rods Wt. per 1,000 lin. ft.	145#	147#	154#	161#	169#	177#	181#	185#	193#
HEAVYWEIGHT 3/16″ Side Rods • No. 9 Gage Cross Rods Wt. per 1,000 lin. ft.	192#	195#	202#	210#	217#	225#	229#	233#	241#

NOTE — Special sizes available to meet specific application needs. Prefabricated corner and tee sections available.

FINISHES AVAILABLE — Brite Basic, Galvanized, or Brite Basic Hot Dip Galvanized after Fabrication.

Manufactured from high tensile steel conforming to ASTM Standard A82-62T or Federal Specifications.

SPECIFICATIONS FOR LADUR TYPE MASONRY WALL REINFORCEMENT

Masonry wall reinforcement shall be Ladur Type, a Dur-O-waL product (or approved equal). Reinforcement shall be manufactured from cold drawn steel wire conforming to ASTM Standard A82-62T, and shall consist of two deformed longitudinal rods welded at 15 inch intervals to 9 gage cross rods forming a ladder design. Out to out spacing of side rods shall be approximately 2 inches less than the nominal thickness of the wall or wythe.

Unless otherwise noted on plans, reinforcement shall be installed in first and second bed joints 8″ apart immediately above lintels and below sills at opening and in bed joints at 16-inch vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend 2 feet beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical control joints. Side rods shall be lapped not less than 6″ at splices. Reinforcement shall be so placed as to assure a ⅝″ mortar cover measured from outside face of mortar joint.

Prefabricated or job fabricated corners and tee sections shall be used to form continuous reinforcement around corners, and for anchoring abutting walls and partitions. Material in corner and tee sections shall correspond to type and design of reinforcement used.

CONTINUOUS RECTANGULAR TIES

RESEARCH — Tests of 8-inch and 12-inch wall panels of brick facing and concrete masonry back up, indicate that panels tied with standard weight Continuous Rectangular Ties were stronger than panels tied with brick headers. Average compressive strengths on the gross bearing area were 640 psi and 585 psi respectively.

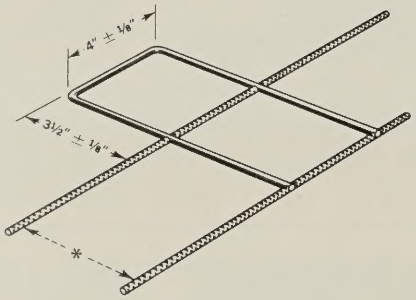
See Research Report, Composite Walls, Page 4.

SPECIFICATION FOR CONTINUOUS RECTANGULAR TIES — Reinforcement for composite and cavity walls shall be Dur-O-waL Continuous Rectangular Ties, or approved equal. Wire shall conform to ASTM Standard A82-62T. Side rods and rectangular ties shall be not less than No. 9 gage. Rectangular ties for cavity walls shall be galvanized.

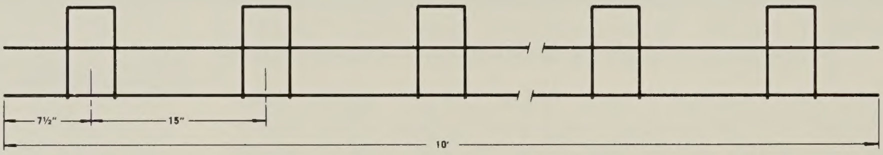
Unless otherwise noted reinforcement shall be installed in the first and second bed joints 8 inches apart immediately above lintels and below sills at openings and in bed joints at 16″ vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend 2 feet beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical control joints. Side rods shall be lapped at least 6 inches at splices. Reinforcement shall be so placed as to assure a ⅝″ mortar cover measured from outside face of mortar joint.

Prefabricated corner and tee sections shall be used to form continuous reinforcement around corners, and for anchoring abutting walls and partitions. Material in corner and tee sections shall correspond to type and design of reinforcement used.

SOLID COMPOSITE WALL



(WITHOUT DRIP SECTION)



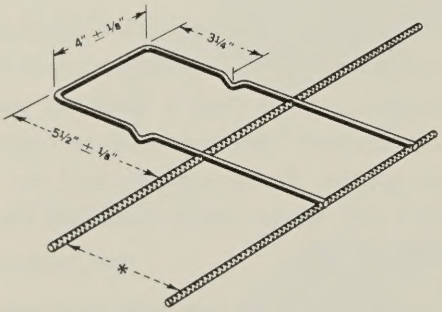
WALL WIDTH	*WIDTH HORIZONTAL RODS
8	2¼″ ± ⅛″
10	4⅛″ ± ⅛″
12	5⅞″ ± ⅛″
14	7⅞″ ± ⅛″
16	9⅞″ ± ⅛″

MANUFACTURED FROM HIGH TENSILE STEEL ASTM A82-62T. AVAILABLE IN — BRITE BASIC SIDE RODS WITH GALVANIZED STEEL TIES, ALL GALVANIZED STEEL OR BRITE BASIC HOT DIP GALVANIZED AFTER FABRICATION.

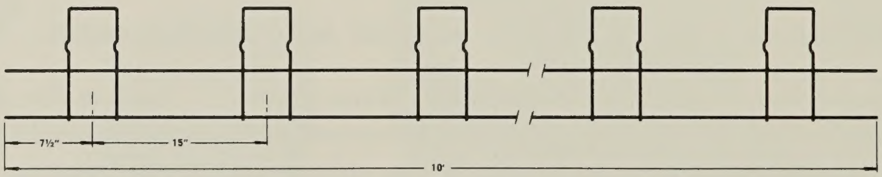
9 Gage Side Rods, with 9 Ga. Ties
8 Gage Side Rods, with 9 Ga. or 8 Ga. Ties
3/16″ side Rods, with 9 Ga., 8 Ga., or 3/16″ Ties

NOTE: Prefabricated Corner and Tee Sections corresponding to Type and Design are available.

CAVITY WALL



(WITH DRIP SECTION)



WALL WIDTH	*WIDTH HORIZONTAL RODS
10	2¼″ ± ⅛″
12	4⅛″ ± ⅛″
14	5⅞″ ± ⅛″
16	7⅞″ ± ⅛″
18	9⅞″ ± ⅛″

MANUFACTURED FROM HIGH TENSILE STEEL ASTM A82-62T. AVAILABLE IN — BRITE BASIC SIDE RODS WITH GALVANIZED STEEL TIES, ALL GALVANIZED STEEL OR BRITE BASIC HOT DIP GALVANIZED AFTER FABRICATION.

9 Gage Side Rods, with 9 Ga. Ties
8 Gage Side Rods, with 9 Ga. or 8 Ga. Ties
3/16″ side Rods, with 9 Ga., 8 Ga., or 3/16″ Ties

NOTE: Prefabricated Corner and Tee Sections corresponding to Type and Design are available.

TECHNICAL DATA AVAILABLE

DUR-O-WAL DATA FILE — This Comprehensive Data File is an attempt to draw together major recommendations on masonry wall reinforcing proposed, or adopted by agencies of the Federal government, private research organizations, and the Dur-O-waL company. The work is as complete, factual and objective as possible.

If you have need for this important Data File — contact your nearest Dur-O-waL manufacturing plant for free copy.

RESEARCH SOURCES & REFERENCES

"Comprehensive Data File," Dur-O-waL National, Inc.

"Investigation of Masonry Wall Ties," by S. A. Bortz, Armour Research Foundation.

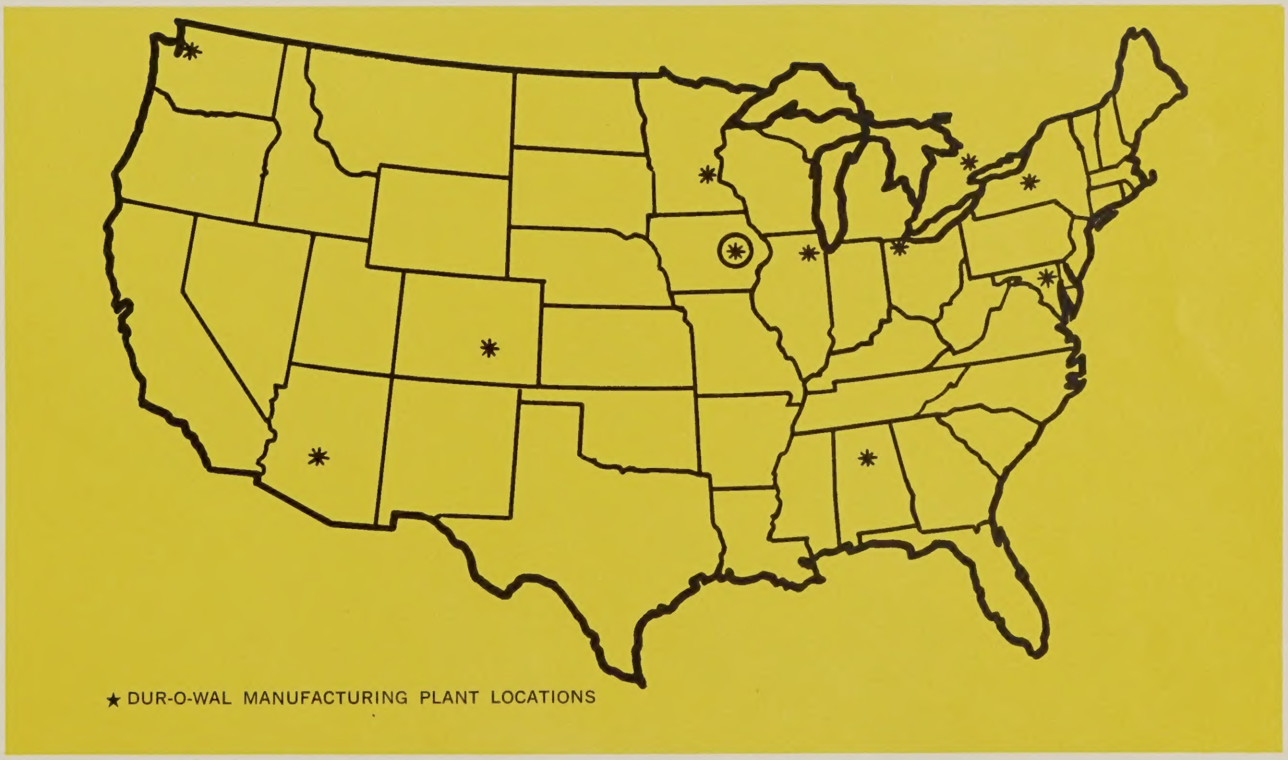
"Flexural Strength of Cavity Walls," by S.A. Bortz, Armour Research Foundation.

"Transverse Strength of Concrete Block Walls," by F. W. Cox and J. L. Ennenga, ACI Proc. Vol. 54, p. 951 (1958) (Reprint).

"Investigation of Continuous Wire Reinforcement as a Replacement for Brick Ties in Masonry Walls," by S. A. Bortz and Albert Litvin, ACI Journal, May, 1962 (Reprint).

"Load Tests of Patterned Concrete Masonry Walls," by R. O. Hedstrom, ACI Journal, April, 1961 (Reprint).

"Dur-O-waL Adjustable Wall Ties, Their Structural Properties and Recommended Use," by R. E. Copeland, Consulting Engineer.



★ DUR-O-WAL MANUFACTURING PLANT LOCATIONS

DUR-O-WAL MANUFACTURING PLANTS: **Cedar Rapids, Iowa,** Box 150 ★ **Syracuse, New York,** Box 628 ★ **Aurora, Illinois,** 625 Crane St. ★ **Toledo, Ohio,** 1678 Norwood Ave. ★ **Baltimore, Maryland,** 4500 E. Lombard St. ★ **Birmingham, Alabama,** Box 5446 ★ **Phoenix, Arizona,** Box 49 ★ **Pueblo, Colorado,** 29th and Court St. ★ **Minneapolis, Minnesota,** 2653 37th Ave., S. ★ **Seattle, Washington,** 3310 Wallingford Ave. ★ **Hamilton, Ontario, Canada,** 789 Woodward Ave.

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